

Field Trip

April 23-27, Oct. 25;

1957

April 23

Visited Deane Hills. Went to Windmill section. Concluded we had landslip blocks.

Then went to my Artinskian locality. Collected. Then went to shale just under easternmost of two high knobs. Went up to Hess ledge which forms the crest of this hill. Saw a landslipped block on the east face of this hill. Spyridiophora common just above the Hess ledge and possibly present in it.

Afternoon went over to center of hills to see my second Artinskian bed. In Hess flat here, and in Hess west of here, saw blocks with silicified Coscinophora. Suggests that so-called Coscinophora may be not in place.

Late afternoon visited James Artinskian locality. This is on W side fault about $1\frac{1}{2}$ miles NE of Lanox. The lower 200' of Wolfcamp is mostly massive, broken at base. Goniatites are common and extend up at least 150'. Fusulines are common about 200' of Congl. above in W.C. Hess ledge hard to see at this place but shaly beds with Spyridiophora occur above the Hess ledge which is difficult to individualize.

April 24

North of Hess Ranch the
Succinea beds are faulted
 against dolomites which King
 calls East Hess series.

Found *Paratellus* loose about
 middle Hess Ranch Horst section. This
 section unusually long and may be
 mostly high Wolfcamp, some higher than
 hitherto believed.

Wolf Camp Hills.

Proper number just under 3rd ls above
 Creek elbow. Seems to be just above
 continuation of 12 but does not seem
 to be the bed above 12. It is the
 3rd ls above the ls forming creek
 bed at elbow. It is probably about
 to 12? Better use my own numbers.

This bed is 80 paces N (upstream)
 from elbow of creek, where Creek
 forks. Check notes for position and
 Cooper number.

~~Yugoslav fusulinid paper for Gann~~
~~Information on collecting sacks~~
~~for Gann.~~

✓ ~~Send Gann fusulines from Hess~~
~~beds.~~

0484

October 25

Oct 25 - small patch of yellow limestone surrounded by biohermal gray beds. Barnes thought it in place and thought the fusulines had a Wolfcamp look.

Oct 25' - just on east side of fault yellow beds underneath thick ledge of Hess. I think this is upper Wolfcamp underlying the Hess.

Oct. 25³ - Fusuline sample taken on west nose of hill above Wolfcamp shale above Artinskian locality. Specimens from dark limestone lying on top of Hess ledge. At this place some yellow platy shale appears at the top of the Hess ledge.

703t
701m

538

4
5880
4750
1130

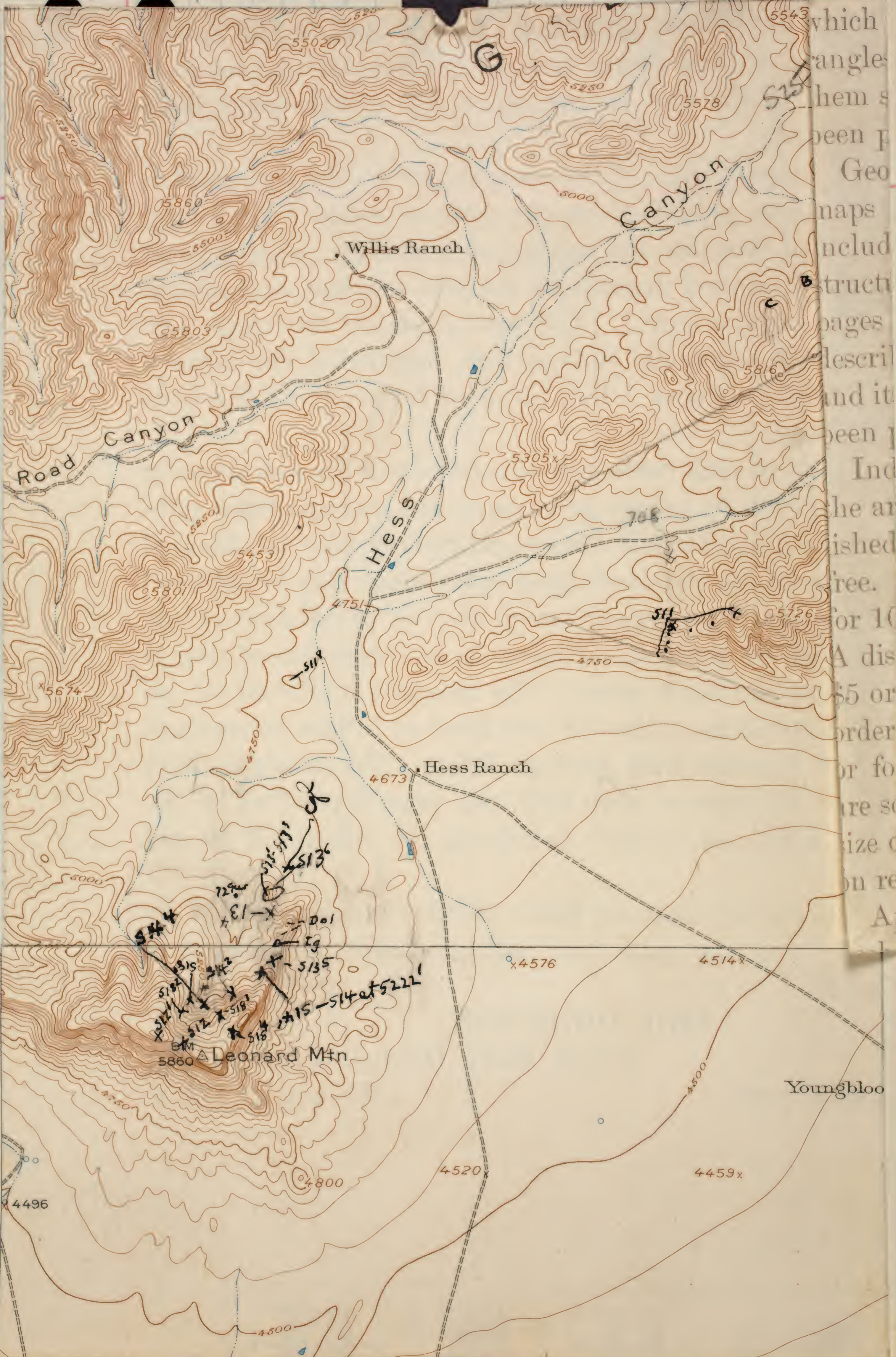
Glass Mtns.
September 1957

Hess Ranch	2
Leonard Mtn.	4, 7, 9, 17
Hess Ranch Hurst	15
Neal Ranch E of Split Rock	16
Deeie Hills	20, 23, 29, 30
N side Deeie Hills	25,
Windmill hill	26, 28
Hess - Word #4	
Willis Ranch	15
Santa Ana	1

75
675
5989
675
5141
3112

29

0443



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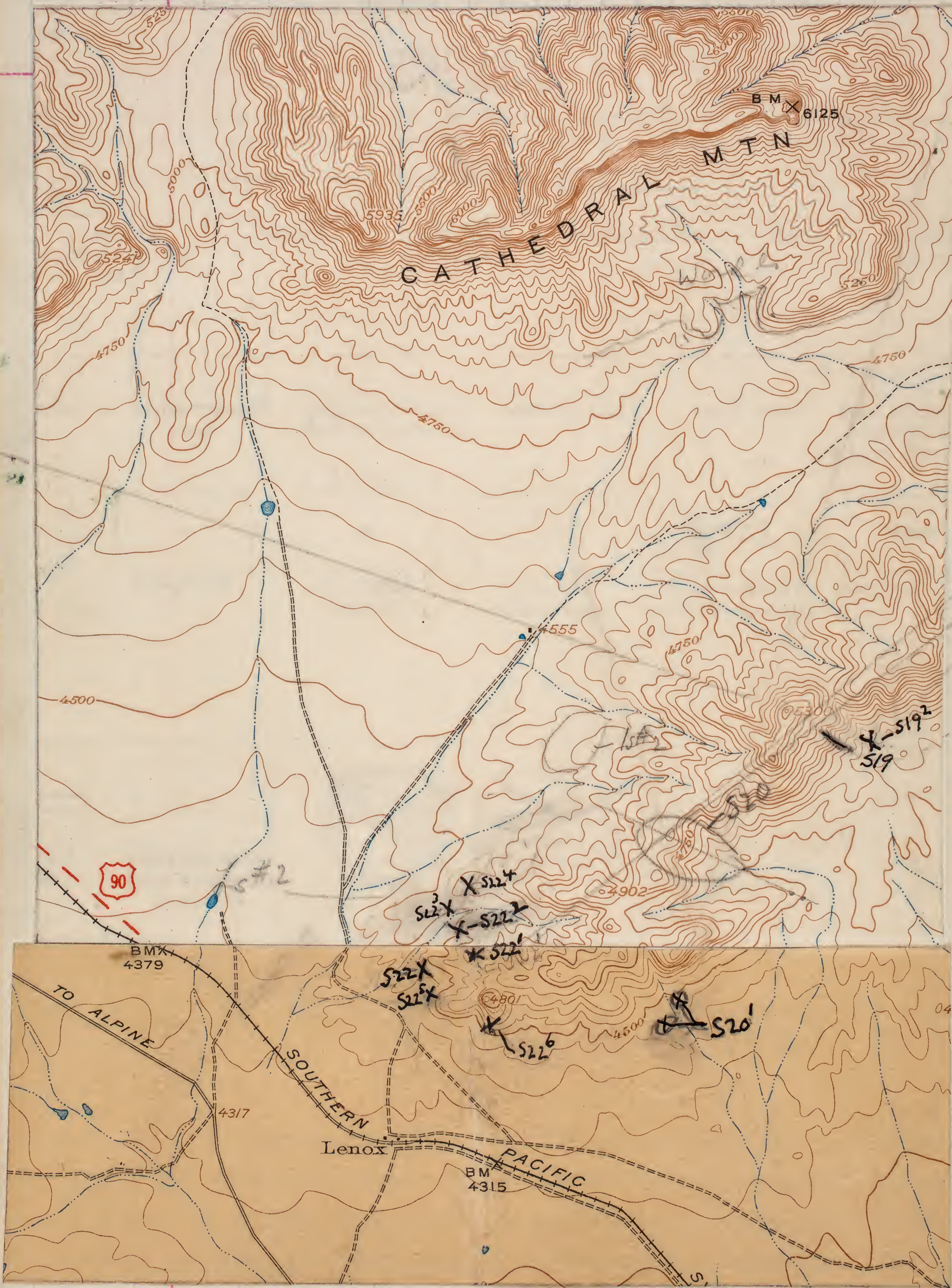


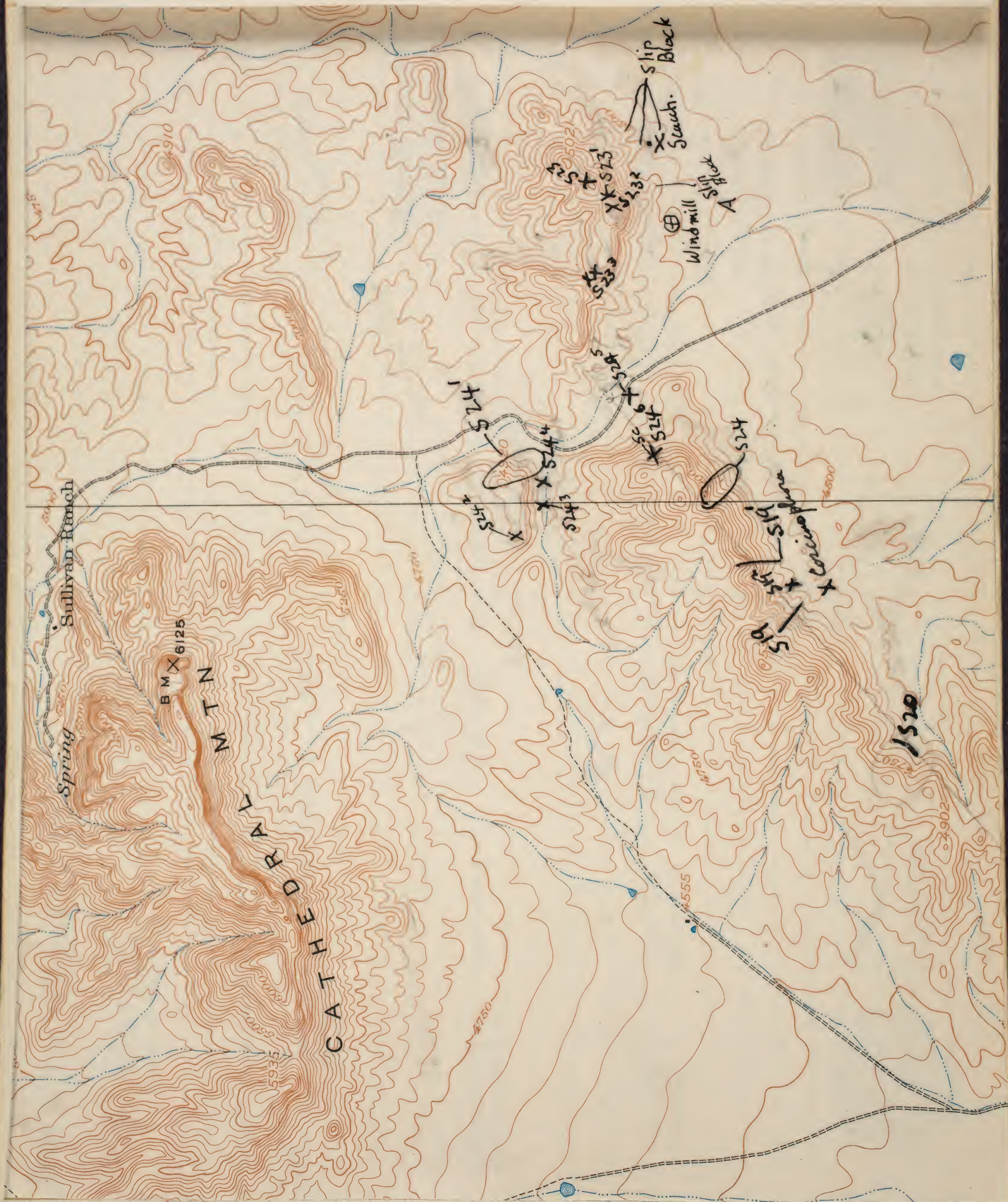
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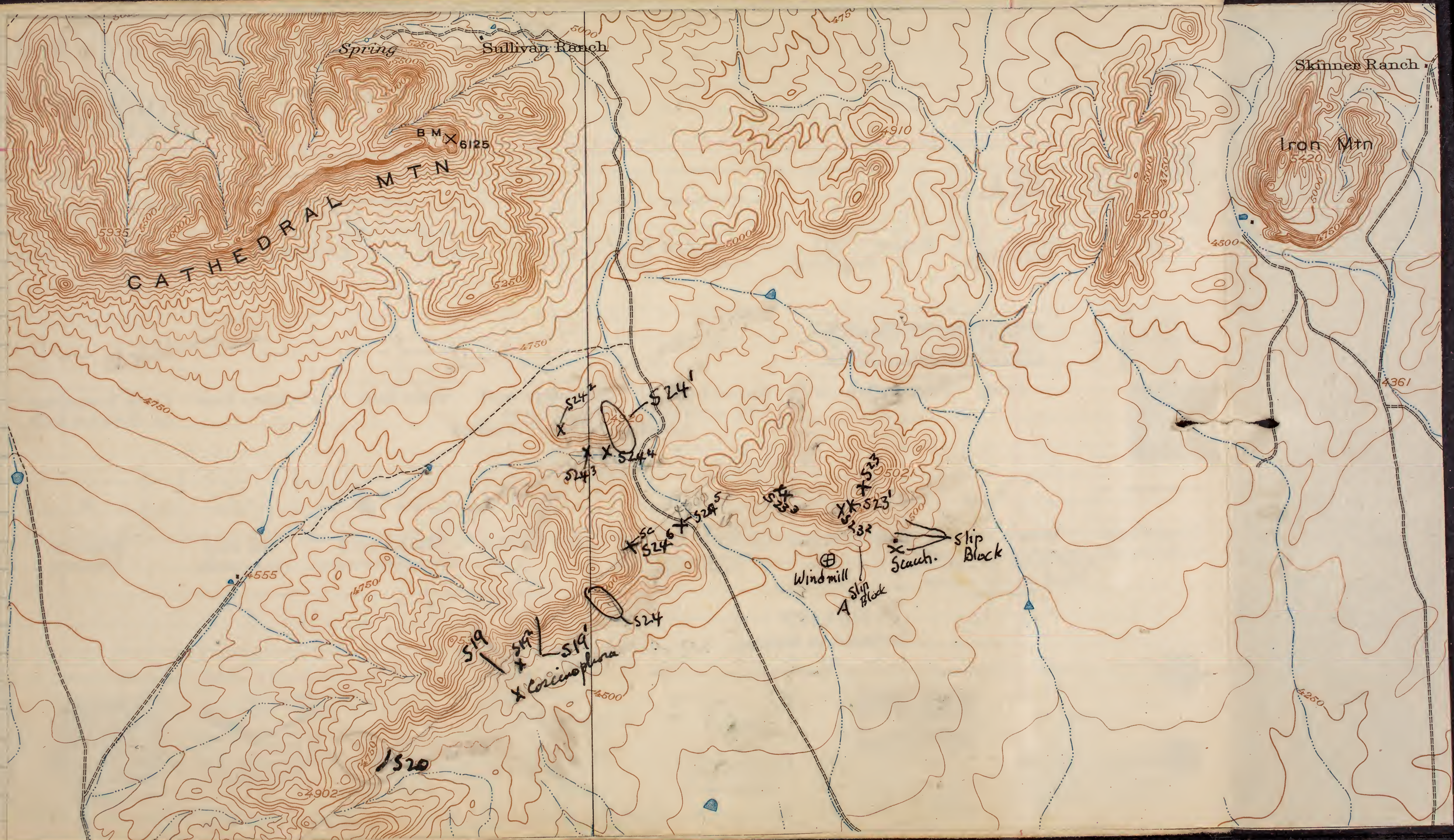
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0444



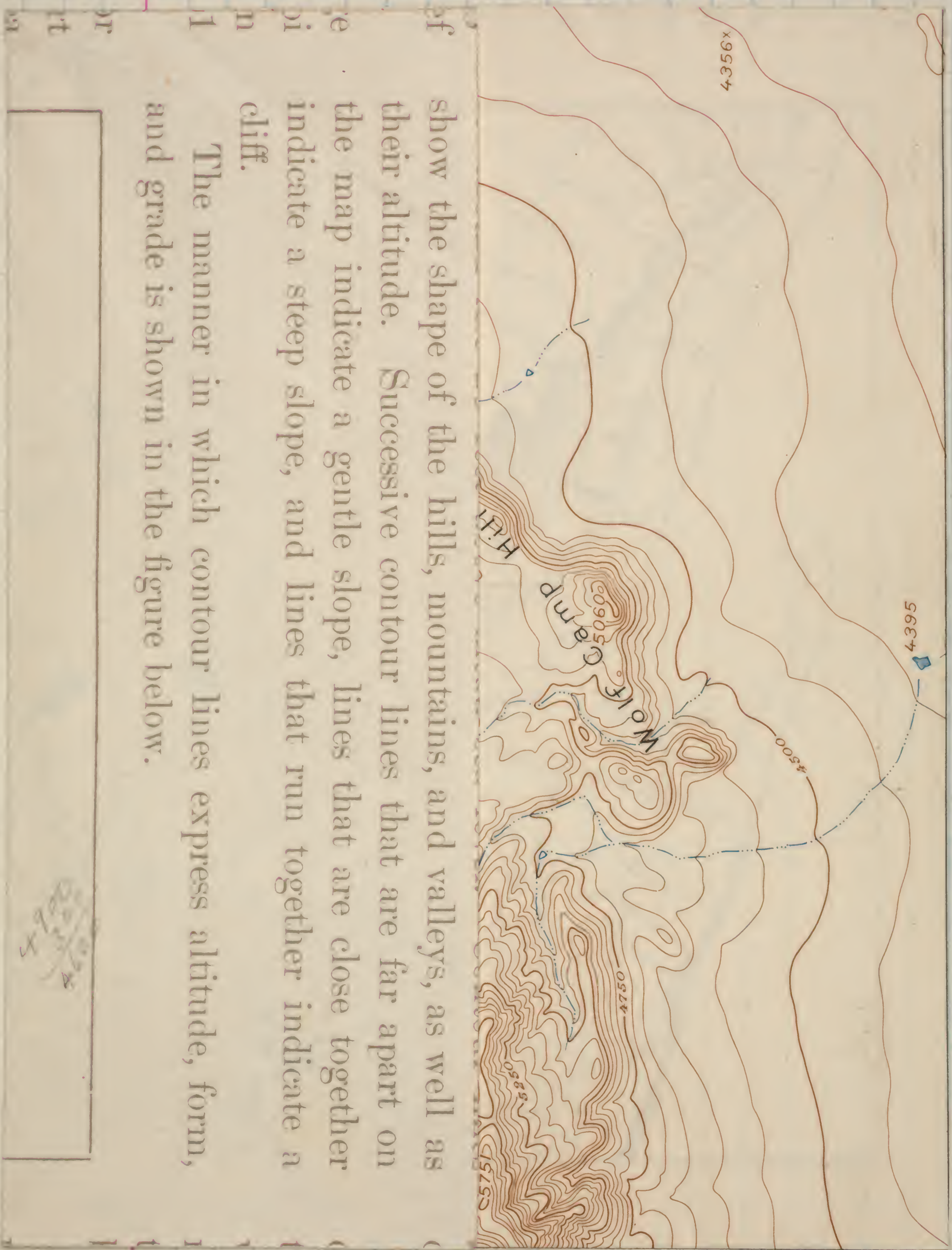




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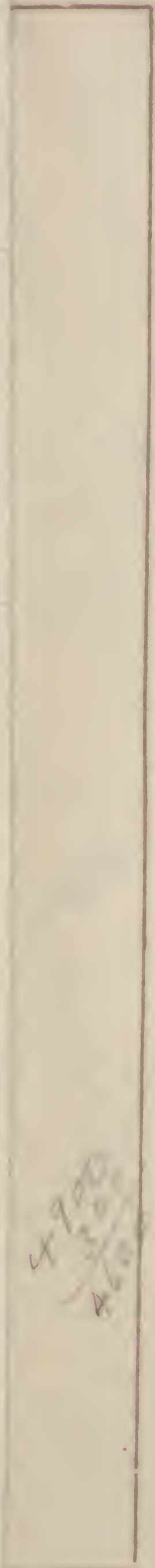
193
108
301

FORD



show the shape of the hills, mountains, and valleys, as well as their altitude. Successive contour lines that are far apart on the map indicate a gentle slope, lines that are close together indicate a steep slope, and lines that run together indicate a cliff.

The manner in which contour lines express altitude, form, and grade is shown in the figure below.



0446



222
222
222

0449



①

Sept. 10

Section on US 67, $1\frac{3}{4}$ miles east of junction with Texas turn rd 116 and $1\frac{3}{4}$ miles east of Center of Santa Ana.

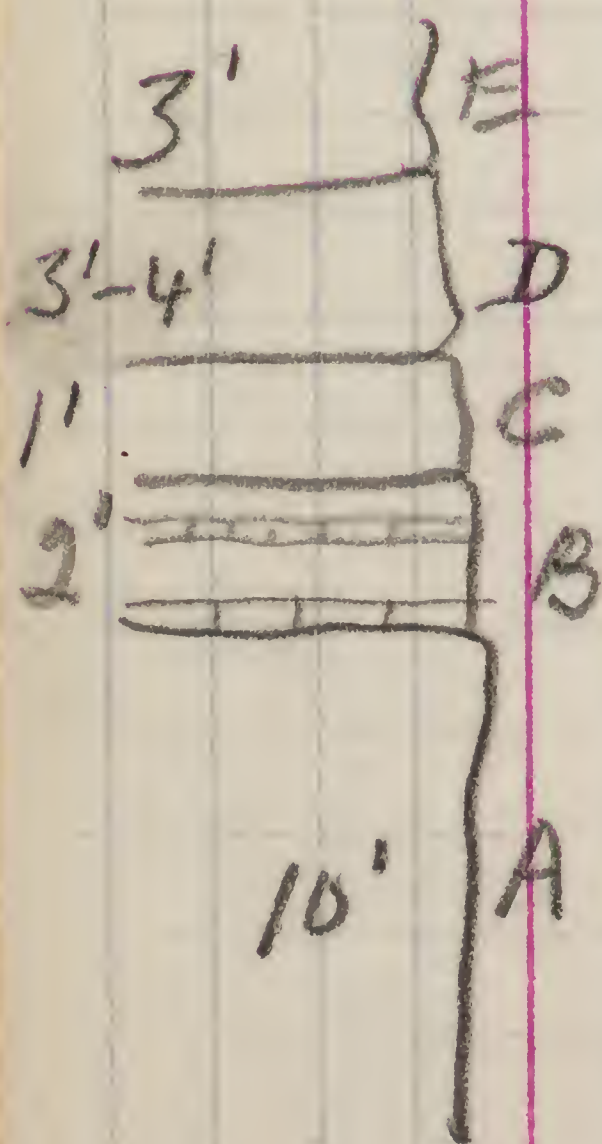
A. - Shale soft friable mostly blue gray weathering pink in places. Large *Chonetes* common, large *Derbyia*. Scattered thin ls beds as lenses.

B. Thin limestone separated by shale as below. *Bryozoa*, *Halysites*, *Clonothyrina*. Several layers of limestone, basal one about 6" - 8" thick. Ls yellowish, irregular surfaces.

C. Hard brown limestone 1' thick

D - Mealy limy shale & thin ls. with crinoid stems. Upper ls bed about 3" - 4" thick.

E Shale 3' weathering red.



(2)

Sept. 11, 1957
East of Hess Ranch280' above top of knob in high hill is top
of 10' mass of dolomite this is at about
5530'

Dip on hill N 70° W 10° N

Slope above knob 5250' is mostly ledgy
light gray dolomite & dolomitic limestone.
Fossils are few, mostly fusulines and
mostly nearly destroyed.

709d	S 11	- - -	4961'	
e	S 11'	- - -	5091' ✓	Crassitectoria
f	S 11 1/2	- - -	5174' ✓	"
g	S 11 3	- - -	5194' ✓	"
h	S 11 4	- - -	5200' - also goniatite	"
i	S 11 5	- - -	5220'	
j	S 11 6	- - -	5250' top of hill	
k	S 11 7	- - -	5260'	
m	S 11 8	- - -	5418	

Went N up hill with knob at 5250
and saw west facies of Hess. Mostly
granular gray weathering limestone
often with algae resembling fusulines.
Little or no dolomite seen throughout
hill from 4961' to top at 5250'.Went east of knob up hill ending
at 5726. Went to west end of knob
ending at 5677. The west facies
type of rock appears for a short
distance up hill east of knob but
disappears at about 5300'. Above
this the rock is mostly dolomite,
fairly heavy bedded but with
occasional flynn bed. Found only
one undolomitized fusuline bed.

③

S119 - visited knob $3\frac{1}{4}$ mile NW of Hess Ranch. Lower part of heavy bedded dolomite. Hill capped with weathered yellow siliceous shale with thin limestone. All rocks much altered. Few fossils. Saw Stenoceras and Oriskanyella. This appears to be Leonard.

Barner Wilde says S11 may be Wolfcamp.

12/140
12
26

(4)

September 12.

Leonard Mtn.

Brachiopods seen about $\frac{1}{2}$ way up in loose block.

10' above conglomerate of WC comes a 2' bed of sandstone with chert pebbles. This is identical to the rock containing ammonoids on Dugout Mountain. The bed seems to be local?

27' interval between cgl & light gray ls. consists of scattered *Brachiopoda* & algal bioherms, very irregular, shale and shaly ls. abounding in large fusulines

27'-50' granular ls like Hess West facies but with big bioherms, with large *Leptodus* at about 40'

50'-92' - granular limestone, detrital somewhat finer than below. Big *Michelia* at 90'.

92'-125' Similar granular limestone light gray to white when broken. Biohermal humps still present, bluish.

125'-152' mostly covered probably same as below

152'-202' - Mostly massive granular limestone of Hess West facies. At 202 the dolomite of the great cliff comes. This 50' zone is a lime-sand, contains fusulines.

(5)

At base of thick dolomite is about 10' of cgl. All dolomite, suggesting alteration of a ls. cgl. lam. or sandstone if the big mass is a sand like the top of WC and may be WC.

South side West Knob
Leonard Mtn

Knob rests on massive Leonard here a limestone rather than a dolomite

A - Massive limestone with scattered pebbles. Sponges, cupcorals, bryozoa. Looking SE from this part of Mtn. The dolomite we came thru which is so thick thins west and seems to pinch out. At same time the thick detrital ls under the knob thickens west and thins out on the greatly thickened dolomite. The great thickness of ls under second knob thins out on the knob with bench mark 5860. Possibly the two are facies.

40' } D
37' } C
43' } B
Massive ls. } A

NW ————— SE
limestone Dolomite

B - 43' of yellow + pink platy shale, the characteristic Leonard shale.

Under the second knob there must be 75-100' of limestone, but under the eastern knob only a few feet.

⑥

C - 37' massive detrital ls. with pebbles. Scattered fossils.

D. 40' of platy shale interbedded with dark gray granular limestone in beds ranging from a few inches to one foot or two feet.

The 5860 knob is about 60' of limestone above the dolomite which includes the Syndiosphora beds. The dolomite seems to me to be a secondary development.

709m S 12 - comes from saddle between knobs of Leonard Mtn.

7090 S 12' - Bed D of section on west knob of Leonard Mtn. Somatites from very crest of Knob.

When going down the section on leaving the hill I found a loose specimen of *Omphalotrochus* in the thick dolomite. This may have some bearing on the section on the small knob at the northeast end of Leonard Mtn.

⑦

September 13.

Small Knob on NE side Leonard Mtn.

"Base of
Parent Knob"

715V

A - Limestone cgl of Wolfcamp.

B - Biohermal ls. strongly resembling Wolfcamp. Contains *Seacalymella*?, *Parentolites*?, *Fusulines* coll. 513 = 715V 85' below top of Knob? Patches of dolomiteC. Flat-bedded ls. possibly 25-40' with *Seacalymella* and other fossils suggestive of H.R.

D - Cliff-making ledge of light grey, psolitic + detrital ls. with many fusulines. Colls:

S13¹ - base of ledgeS13² - 15' above baseS13³ - Very top of ledge at

709p

709g

709r

30'	D
90'	C
150±	B
Limestone cgl. in flat at base of hill	A

Slope just S of Knob is of Wolfcamp type rock, massive with smooth patches. Also patches of dolomite Coll 513⁴ = 7095

Just south of knob we go up slope with dolomite knob on it. Whole slope underlain by WC lithology, also suggests the Hess ledge. Crinoid stems 1" across.

⑧

709t

513⁵ just south of igneous body in saddle just S of Twin Knobs. Conglomerate which I take to be the top of the cgl of the WC appears just S of igneous body in saddle. To South the cgl is overlain by fossiliferous WC in places shaly and shedding loose fragments. Trilobella is common in brittle limestone. Elevation is about 5200.

The section seen today helps to solve the puzzle N of Hess Ranch. I suspect that the beds just N of the Hess house belong to uppermost WC and the HR beds are lowest Leonard. The beds at the small knob on NE end of Leonard occurring between the cliff and the Wolfcamp appear to be HR and they also have strong suggestion of the beds on the back slope of the Hess Ranch Herst. They also suggest possible assignment to the Hess ledge on the Decies place. They are not in accord with the Syndrophon beds at top of Leonard mbr. These beds with HR fossils may actually be in the dolomite of the SE face, the *Ampholotus rochus* seen there in 512 being supporting evidence.

2 blocks from 513⁶. = 709u

⑨

September 14

Leonard Mtn
4 views Leonard Mtn.

- 1 - back slope from Hess Ranch
- 2+3 - East face from $\frac{1}{2}$ mile S of Hess Ranch
- 4 - Small knob on NE side Leonard Mtn.

At the south angle of the small knob the HR thins radically from 90' on N end of hill to only 10 or 15' at S end. From N end of knob we go SW on slope from two knobs. WC is exposed on N end of slope at knob. A few rods W the rounded massive WC is covered by thin platy beds of HR with *Scacchinella* and huge *Ompholot rochus*. This is only a skin on the WC. Then come heavy-bedded platy limestone like that of the crest of the knob. It looks as though HR thins out southward & SW on the massive WC.

Just N + W of gully heading into twin knobs and about middle of slope (E-W line?) between twin knobs rock is all dolomite. The dol changes from platy to massive to the south. On N slope of gully ① the dol. has large *Giboid* stems as ghosts and suggests the upper WC massive beds.

at 5100' in gully ① we come on conglomerate, WC cgl. here somewhat sandy. Probably near top of cgl.

(10)

Ig. Igneous rock on slope at 5200' just under 1st knob S of Twin Knobs A on map. Down hill is ls. cgl. & platy ss float. Ls. cgl in place. Above is mass, massive ls. probably WC and knob formed of dolomite which is part of the main dol. on the front.

Dike extends to a point under knob A. Looking N from near knob A. the lower Leonard forms a loop on the NW side of Twin knob, on flank of west side.

709v 514 - S 30° E of Knob A, in sandy cgl. at 5222'

709w 514' - Under Knob at about 5280' patch with abundant fusulines. Contains also reefy patches of *Streptorhynchus*, *Merchella*, *Pentelites*. The Knob which is dolomite undoubtedly belongs in WC as it overlies this level. The WC on this Knob makes a loop which ends at about the dike, below which we have upper cgl of the WC.

Just W of 514' we come into cgl on slope but next small ravine opposite saddle between knobs A & B seems to be WC. Lamellar algal ls seen in this small ravine on west side Knob A

709x

(11)

S14² - west side of first gully under big knob B. Big road between A & B all Wolfcamp except for cgl seen between S14¹ & S14² near S14¹.

Slopes between 3 small gullies just on N side of Knob B are all massive dolomite. Just on W side big gully just west of S14² we come into massive limestone again.

Slope just N of saddle between knob B & 5860 is mostly dolomite but with patches of limestone. Here we found a loose *Defordia defuncta*.

709y

S143 just S of King's loc 207 on long slope between ravines the major west branch on the left of the locality, many loose sponges of the H R type.

709z

S144 A massive ledge of limestone containing numerous sponges and brachiopods. This combination suggests the Leonard. These may not be in place.

714a

A-S145 - in westernmost gully, about King's loc 207 at 5200' in gully about 25' of bedded detrital ls with large fusulines, I think this is low in post cong. we.

A 5200-5227 Same as ^{described} above but top in massive ls.

5200-5232 covered.

5232-5243 - massive granular ls. Light gray weathering.

(12)
S146
7146

5243-5248 covered

5248-5273 - Massive granular ls with bluish patches. Still looks like W.C.

5273-5289 covered except for about 2' of granular ls.

5289-5321 - mostly covered but with one silicious mass.

Heas
Ledge
S149
5321-5332 - Massive ledge abounding in large *Leptochinella* & early *brachyozoids* all strongly reminiscent of H.R. locality

5332-5359 - mostly covered but bioherm at top containing brachiopods but I could not identify them.

5359-5419 - mostly covered but containing thick plates of granular ls like the thin beds of H.R.

5419-5485 - mostly covered but 5' of yellow Leonard shale at base. Heavy ledges scattered

5485-5550 - Heavy massive ledge of granular light gray limestone. Above this limestone comes the thickness measured on the West Knob of Leonard Mtn on S12.

In the heavy beds here I saw smooth layers with *Edriosteles*. These look very much like the *Limbella* in the Wolfcamp.

$$\begin{array}{r} 32 \\ 5 \\ \hline 160 \\ 14 \\ \hline 174 \end{array}$$

(13)

About 20' above massive *Brachinella* bed are thin to about 1/2' thick with *Leptodus*, *Brachinella* *Composita* + others like H.R. The H.R. beds must go up at least to the shale.

Big *Heliospongia* is abundant in the H.R. Bedd. One large *Defordia* type found loose.

Collecting in Knob on NE side Leonard Mtn. Hand levelled to base of cliff from top of conglomerate in valley. The hill is about 204' high. The Conglomerates are therefore at about 4796.

714c S147 = Wolfcamp 120' below top of small Knob NE end Leonard mtn. = S13

Picture 5 = Thinning HR at base of small Knob at NE of Leonard Mtn.

714d S148 = 1 foot above massive WC in base of HR, here about 20-40' thick thin bedded. Small Knob on NE end Leonard Mtn.

714e S149 - *Brachinella* reef = King's loc 207.

714f S1410 10-15' below top of massive WC north end NE Knob of Leonard mtn.

714g S1411 - 5 1/2' below top of massive WC ledge, north end Knob at NE of Leonard Mtn.

(14)

On leaving the slope with large *Scacchinella* we angled off the hill to the NE heading for the point where the gullies unite. Low in the hill and along the major gully we encountered dolomite massive, with bryonoid stems which suggested to me that here the WC has been dolomitized. This is evidently the N pointing spine of King's Hess (East facies).

I think the dolomite in Leonard mtn should not be regarded as a special facies because it is patchy, irregular in distribution. In one place we collected WC fusulines in good ls a few feet from the point where it passed into dolomite.

The dolomite shows various degrees of mineralization from just faintly dolomite to strong dolomite. In places recognizable fossils appear in the dolomite that have not been destroyed.

(15)

September 15

Up back slope of Hess Ranch Horst. Big knob marked C seems to be mostly ls in the lower part but the N crest is dolomite. The limestone appears to run in to dolomite. The small intermediate knob marked B is mostly dolomite, especially on the N facing slope.

Knob A is mostly very massive limestone, calcarenite.

714h

S15 - fusulines from bed of dark limestone on top of hill $\frac{1}{2}$ mile NE of hill 5816.

After this stop went to low hill about $1\frac{1}{4}$ miles NE of Willis Ranch. Limestones altered and fossils poor. Also visited nose of hill one mile S of Willis Ranch. Word #1 at this place consists of massive limestone poor in silicified fossils. Two blocks taken here in 1956.

Visited 708 but in $1\frac{1}{2}$ hours of collecting could find no good blocks.

(16)

September 16
 Mead Ranch
 Mr. & Mrs. Wren Hall
 Marathon, Texas

Sent pictures of fossils.

S16 Algae surrounding fusulines

S16¹, S16² fusuline samples on long dip slope of Hess. S16³ produced from dip slope. Spent all morning in a vain effort to find Kings f.b. south of old Word Ranch in vicinity of Hall 5-785.

The dip slope of the Hess is of various degrees of dolomitized limestone often abounding in fusulines, well preserved in the limestone but just ghosts or cavities in the dolomite.

In afternoon worked on a special block at Split Tank but failed to get it.

All in all it was an unprofitable day.

S16 = 714 i.
 S16¹ = 714 j
 S16² = 714 k

①7

September 17

714 am

S17 - Fusulines high in Word #4

Hess Ranch foreman is Enrique Garcia.

Walked over acres of Word #4 much of it dolomitized, much of it unfossiliferous and much of it with thick masses of chert. In places the rock is made up of fusulines. Collected on a hillside about $\frac{1}{2}$ mile = S17³ west of road

S17¹ - Fusuline pieces from near S17³.

September 18

Leonard Mtn

Scacchinella located on side of hill (S18 at 5200'). This is N60°E of knob B + N75°E and on knob C at N35°E. Here we are 50' above the stream. About 750' W comes the Scacchinella bed at 5300' where we saw it on S146

At 5335 on slope along gully a massive ls contains many cup-like Leptodus, suggestive of those in the Hess Ledge. Also present are large Diplonina, fine-lined Streptorhynchus like those in the Hess ledge. With all these are numerous Defordia sponges. This occurrence strongly suggests the Hess ledge of the Belle Hills

714p

= S18¹

(18)

The Hess ledge differs in being very conglomeratic.

7144g

Scacchinella bed on slope at S182 at 5421' just north of a small block of dolomite. Collection made.

5529' patch of ss.

7144n = S183

5535 Scacchinella seen in place. Runs into the thick dolomite in about 50-75 yds. From Scacchinella to top of hill in saddle 151' makes saddle 5686'. The Scacchinella is actually thus about 5549'.

Dip measured by sight on west knob of Leonard Mtn. is 7°. On the east knob it is 14°, both to north.

7145 = S184 - faultlines on nose of knob B = 5750' - specimens taken on nose at about 5720'. The Scacchinella bed goes into the dolomite at about the middle. A tongue of dolomite about 30 or 40' thick extends into the ls for about 100 yards 75' above the Scacchinella at S183.

The Scacchinellas collected at S144 as well as the sponges are out of place and probably came down from S184.

Directly above Scacchinella at S146 about 50' is another bank of Scacchinella. This bracketed thus occurs through an interval of at least 50'. This upper level

(19)

abruptly in crinoid stems and thus resembles S/8² where we collected. Our S/8² is thus near the top of the Scacchinella interval. Above this interval is bedded dark granular ls in beds 6" to a foot thick.

185 - up Scacchinella at 5350, just at point on hill where it levels off to north. Platy rock for about 50' above this ledge where light granular lss appears. This may be the point where King's fault runs through.

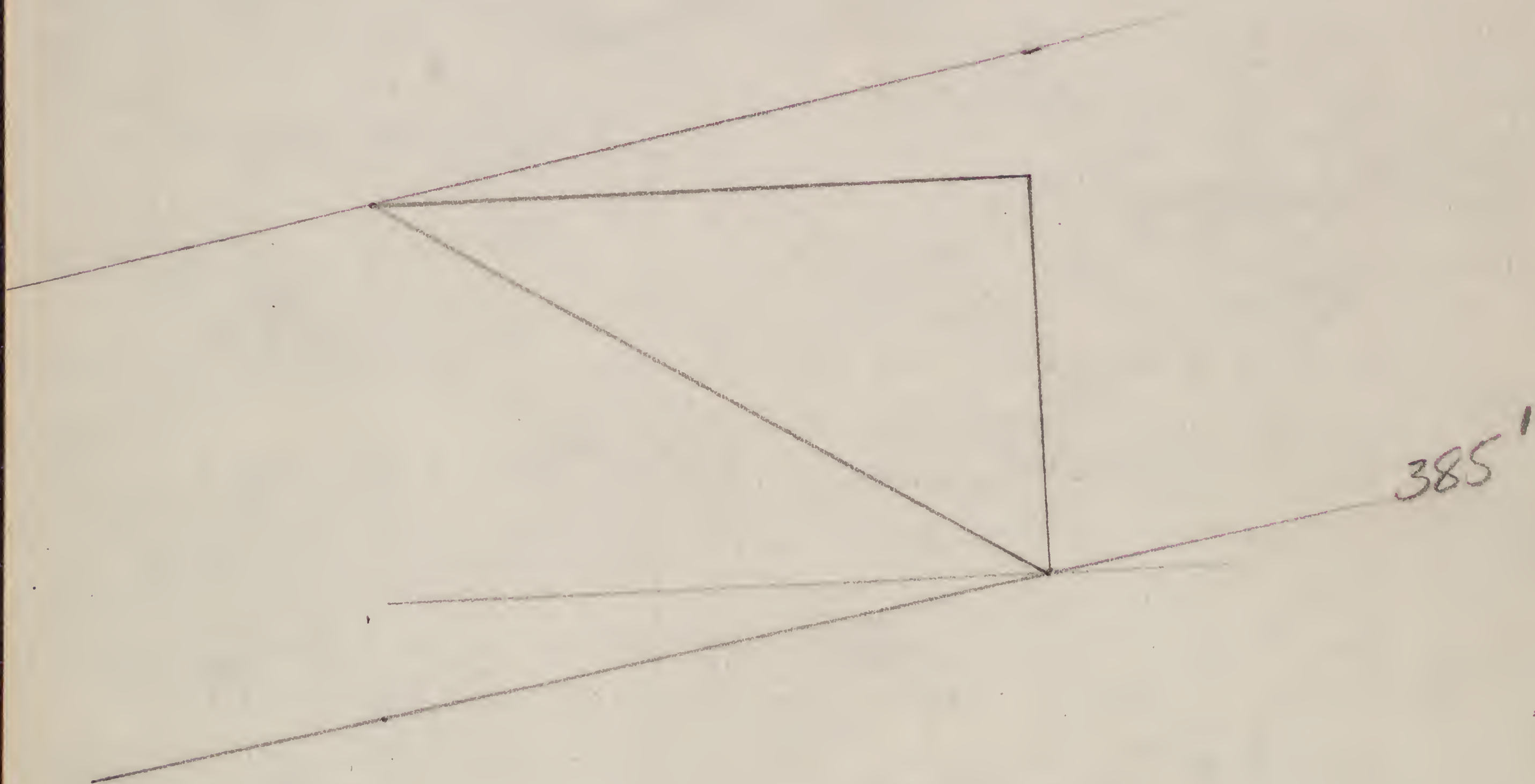
Scacchinella bed appears at 186 which is 0.1 mile + from end of small knob on NE side Leonard Butte.

The Scacchinella bed are mostly in biohermal masses and they have the orange brown spotted so characteristic of the Wolfcamp. Heliospongia occurs in the WC masses but is not common and Defordia is absent.

There seems to be only a small throw to the fault because the Scacchinella bed is thrown down toward the gully & can be traced to $\frac{1}{2}$ up from mouth of gully.

There is considerable yellow shale on the slope above Scacchinella at the supposed fault.

1 mm = 10'



385'

(20)

September 19
Sight from hill 5330' E from Decie House
The knob from which we have

Coscinophora in center Decie Hills is underlain by thin sandstone and angular sandstone + breccia. There is a veneer of rubble on this knob. The productids were almost certainly not in place. The Coscinophora could be in place. Under the brown breccia beds come biohermal limestone and ls. cgl probably 25-30' thick. Then comes the brown breccia probably 200' thick.

Section near
hill 5300' in Decie hills.

Top of kn. taken at a thin platy ss.
Lowest 17' in platy sandy ls. in beds up to 1' thick

At 54' comes a thick (2') limestone with sandy chert layer of 1" on top. Below this the rock has been partially covered but is mostly the dark platy ls. Some pinkish shale appears just below the thick ledge. The thick ledge abounds in large fusulines

At 70' thin (6") ls bed contains *Spyridiophora*

At 80' clay shale in soil overlying a thin ss. bed. 3" + 3" ls.

80'-92' clay shale

92-99' - harder yellowish shale capped by 3" ls. bed.

99'-153' mostly shale with limestone reefs, cgl. beds (ls) up to a foot thick

At 153' comes a thick layer of smooth limestone with bellerophonos. This layer (rather lens) is 6' thick

Top of kn. ledge about
4600-4650'

346.

(28)

153'-169' Shale & ls. at 169' rock becomes more massive the layers being 2-3' thick. This is about beginning of ls. #1. *Spiridophora* loose.

714t =
519

169'-185' - Thick massive bedded ls. separated by a few inches of shale. at 185' comes a bioherm about 20' thick. Collected at base of bioherm.

185'-205' bioherm.

205'-275' mostly thick bedded ss, sandy limestone with two thick chert beds in lower part.

275'-302' - massive conglomerate with limestone and other pebbles.

Did not see any productid blocks but saw productids like the little ones not in place.

Saw a boulder 3'x5' in ls #1 cgl.

519'

Bioherm in Leonard #1 about 1/2 mile northeast of 519.

519' short section weathered ss, probably W.C. = 717X

Under The Hess ledge 60' of slope show blue and gray shales of the W.C. with occasional interbedded sandy ls. The shale contains much small pebble material.

The Hess covers 70' of slope & contains large *Heliospongia* with *Euacchinella*!

Hess ledge about
4650'

(22)

0-75' above Hess - Heavy bedded sandy limestone with silicious caps. Cgl. beds. All separated by thin layers of shale.

At 75' comes a 5' bed of cgl. pebbles small closely packed, but laterally into biohermal ls.

75'-91' At 91' comes a ss bed limy in lower 1'; but pure sandstone in upper 4'. Above this point the slope is greatly covered but the float pieces are smaller generally. Probably considerable shale under the cover.

91'-142' mostly shale. At top a 1' ls.

142-192 - base of biohermal mass about 15' thick. Rock below mostly shale. Biohermal mass has large crinoid stems. Geometrical byozoa.

197-212 - bioherm

212-218 - main mass of Ls. #1

218'-258' - To base of a large bioherm. Saw huge crinoid stems at about 218'. The massive rock extends about 60' higher than the base of this bioherm. The upper beds at top of Leonard #1 look like a sandstone about 20' thick.

In the upper bioherm are masses of geometrical byozoa. *Meckella grandis*. Huge crinoid stems occur as pebbles in rubble under & around the bioherm. The upper sandy beds lap onto the bioherm which thickens considerably locally.

One of the striking features of Leonard #1 is the sand and enormous conglomerate. It is a repetition of the Hess Ledge.

5193 - fossils from large *Beacnelleya* block.

7



* 16000
* 16000
* 16000

7/

V.F.
Cont

Summit

* 2500

V.F.
Cont



(23)

September 20

520

193' of slope above the Hess ledge comes ls. #1 with lowest beds conglomeratic

193' + 108' = Slope measurement of Leonard #1. Then the top is ss. & ls. cgl. massive & like the Hess ledge below

Subtracting from the knob of the hill the Hess ledge top is at about 4600'. Saw no Branchinella on way up.

Beaded Leptodid is in upper part of Hess ledge at 520. It also has fine-lined Streptorhynchus with it. It is likely or possible that 707h was derived from the Hess ledge. Specimens of Coscinophora obtained from Moore may be Hess ledge. Check. — — —

The Leonard ^{between Hess ledge & L#1} in the lower half is in heavy bedded sandy ls. Upper half mostly shale.

The collecting along the Hess ledge was not good. The silicified specimens which I collected and collected years ago mostly come from 520 rather than King's loc 35 which is about 1/2 mile east. This too is different from my big block which should be given a special number. This big block is definitely Hess ledge and not float from Leonard #1. The same is true of the Stenocrinus cracked out.

(24)

In afternoon collected from
Juvra locality at base of WC
This consists of numerous
trichomal boulders well displayed.
One group of exposures extends
as a long tongue but the other
is under the west knob of the
adjacent hill (about 4900' high).
The hill with long tongue is
faulted in comparison to the other.
Artinskian occurs at this place.

Fossils are difficult to obtain and can
only be got by finding pieces that are
fairly well rotted. These are few in
number.

(25)

Get to Midland night of 23rd. Write
Jack Edwards. Tobin for airmaps.

714a Dick 9/22/57 - - - - - \$10
522 - Gasulines - Leonard #1

Leonard
#2
714v

522¹ - Small Knob of ls. About 50' on
east side of Knob. Gasulines &
Schizophoria, Corcinophora, Resuline
sample from SE side, Hill & about
10' below top. Neospirifer, cup corals

Leonard
#1
Schizophoria

522² - knob of biohermal & thin bedded
ls. Some fossils on thin layers. Fossils
broken into a hash. Many bryozoa
Euteletes, Procrithofenia & possible
Ornatella

522³ - massive ls., biohermal many
bryozoans.

Leonard
#2

522⁴ high knob, conglomeratic ls.
Saw loose Corcinophora, Euteletes,
Ornatella, Autosteges trigonalis,

Leonard
#1

522⁵ - Leacchinella in massive limestone
Two large ones seen in place. Many snails
714x

522⁶ - bluff with platy yellow shale
capped by a 15" bed of shell breccia
with silicified shell hash. Then
comes 10' unsorted cal with huge
crinoid stems. Above this is 48' of
granular limestone in flat beds
with silicified caps. Pluridomella
Diplarnus, Beynelia?

1957

0475

(28)

522⁵ The Scacchinella might have been a very badly damaged nautiloid
September 23

At slipped block A just E of

Windmill Hill

Windmill and just above Scacchinella beds along the base of the hill can be found some 10' of yellow Leonard shale in the slope. This underlies the beds with Lumbella. The top of the knob at about 4600' abounds in sponges & corals (cup). Dimple appears in the small saddle at about 4600'.

King maps WC under small knob just E of hill 5021 on Crown Mtn property. Check notes for description of this section.

Knob A or hill 5021 is mostly in granular moderately heavily-bedded limestone with occasional egl. (b) layer especially one 10' ± above the saddle and some scattered pebbles. Fossils are very scarce. Minor amount of bihermal material present but saw few fossils in it.

Knob B - On east side knob about 10' below top comes smooth gray rock with a few fossils. Scacchinella found with Lumbella?, Mosquifer + large Wellerella

Saddle between A + C. The saddle is at 4900' and the head of Scacchinella reefy masses form part of the surfaces of the saddle. Thus the base Scacchinella bed top is at 4900' and the base is at about 4840'. I estimate the cliff at 40' above the base and some 10' to the congl. under it. The Scacchinella beds occur also 10' above the cliff making the

(27)

Windmill Hill

Scacchinella bed about 60' thick.
Above the Scacch. bed comes on the
E side of the saddle 20' of slope with
yellow shale. On the W of the saddle
I measure 24' feet of slope in the
shale plus about 20' covered which may be shale.
The Hess ledge here abounds in sponges.

523' - Scacchinella from top 5' of rock
in saddle = 7142

West Knob C - 24' of shale are visible
on E slope of Knob C but between
here & base of cliff is covered which
would add about 20' more. Shale has
thin pebble beds like in lower Leonard.

On top of Knob C I measured
152' to top of knob. This makes top of
hill about 5050 which is higher than map
measure, see notes on p. 28

4900
150
5050

715f =

523² - *Stenocrisma* ^{near} top of Knob C
and *Geyerella* and *Scacchinella* at very top.

717v

523³ - Sponge beds with pebbles like
top of slipped blocks at A. This bed
paves the ~~down~~ saddle between the
Knob C and the northern knob.

Overlying this is about 75'-100'
of slope with yellow shale, near
top of which is smooth dark thick-
bedded ls. like that on Leonard mtn.

The ls 3-4 here is all dolomite,
about 80' thick, lower half
conglomeratic and with a ss at top.
The upper half is purer heavy-
bedded dolomite. In the lower
half fossils are fairly common.

(28)

Notes on Windmill hill.

I think the maps inaccurate as regards the elevation of the saddle between knobs B + C. The actual distance between the two hills in the saddle is only 100 to 150' at the most but the map shows about $\frac{1}{8}$ mile. I think the knobs should be shown as two contours very close together to indicate the extremely narrow saddle. The elevation of the saddle would be 152' below the hill top. This hill is just under 5000 feet high and is almost as high as the hill A which is 5021'. A good guess at the height would be 4995'. This would put the saddle at 4843' and the base of the Hess at 4763' approximately.

Geyerella and large brachiopods were found on the very edge of the cliff at the highest point of Knob C. Both the Geyerella and brachiopods are the very large forms and give a clue that these fossils at the top of the spur on the west side of the Bullhorn Ranch Road really belong to Leonard #1. This is further supported by the Geyerellas found at S22° on the west end of the Dixie Hills.

(29)

September 24

Walking over spur at east end Deuel Ranch to west the first seems somewhat broken as the fault is approached. At the extreme west end of the spur some 30' of thin bedded clastics overlies the Scacchiella beds I believe to be Leonard #1. This is Leonard type rock like that overlying the Leonard #1 on the main mass of the Mtn.

Handlevelling of section between Hess ledge and Leonard #1 taken in first gully west of spur.

7158

0-55' above Hess ledge, platy thick layers of detrital ls. separated by beds of yellow shale. float block full of large Scacchiella

55'-116' mostly yellow shale.

116'-171' The shale becomes harder and has thick beds of ls. up to 2' thick but separated by 10-20' of shale.

At 171' comes biohermal ls. and what appears to be the base of Leonard #1. Saw no Scacchiella in this bump but big Leptodus is present. Huge crinoid stems in bottom of this bump are about 2 1/2" in diameter.

Limestone #1 measures exactly 130' to head of gully where there is a small fault displacing top about 20'. Biohermal limestone occurs through the entire

(30)

Thickness. One sees many associates of *Scacchinella*, such as *Ceyrella*, *Diambella* and sponges but I saw only one possible *Scacchinella*. They must be abundant however in some places because of the float pieces with them which we saw lower down. The section of Leonard #1 may be 10-20' too thick on account of the fault. This may account for the low position of the first bioherm encountered.

715g

S24¹ - Up east nose of hill 4920. The lowest rock in the hill, 20 or 30' contains bioherms and suggests Leonard #1. I took a *Leptodus* here. This is overlain by yellow shale probably near 75' thick. Above this comes ls #3 & 4 which consist of smooth dark sandy ls. with sandstone lags with a little yellow shale between. *Goniatites* are common in this rock. This ls. is completely different from Leonard 1 & 2. The top knob of the hill is in conglomeratic ss. The bituminous limestone in beds of a few inches to a foot or more, the fairly even bedding and the abundance of *Goniatites* are in striking contrast to the biohermal ls #1 of the Leonard.

S24² - top of knob is in cgl. with shell braccia

S24³ - This is probably upper part of ls #1 of Leonard, massive flat bedded detrital limestone. Some surfaces covered by fossils. *Spizidiophora*, small *Meekella*, small fine-lined *Neospirifer*.

(31)

S24³ actually looks like the heavy beds of detrital ls just on top of Leonard #1. Beds of yellow shale suggest this and the presence of *Chonetes*.

715h

S24⁴ - About 100 yds east of S24³ comes massive limestone cgl with large crinoid stems. This is truly the top of Leonard #1. Dick found *Beudanticeras* in this lump about 15' below top. Only about 20' of low part of the east nose of the hill is in the massive ls #1. The limy detrital Leonard post #1 above is about 30-35'. Thick then comes the shaly beds followed by bituminous, goniatite-bearing Leonard.

S24⁵ small mound ls #1 with *Succinea* & *Entolites*.

0481

September 25.

715i

Collected in moraine on Word #4 hill at elbow of Hess Canyon NE of divide. Good section in hill, yellow shaley rock at bottom, thin-bedded ls with cylinders of siliceous material, heavy bedded ls. Making ledges, dark somewhat bituminous limestone. Fossils not abundant.

Afternoon packed boxes and wrapped blocks.

Mileage on leaving Marathon 170 20

Blocks collected

{ 706 b	-- --	2	
{ 702 c	-- --	3	
{ 706	-- --	3	
513 = 513b	-- --	3	= 709 u
518' - 714p	-- --	1	
5226 714g	-- --	1	
5224 714w	-- --	5	
525 = 715i	-- --	1	
			<hr/> 1869 pounds.

3 boxes at 521 "

Total shipment 2390 pounds.

Sept. 27

Refused admission at Neal Ranch. Returned to Marathon and shipped collections. Left Marathon at 11:45.